Fire and Forest edges affect tree biomass in recovering oak woodlands

Felicity Wang[1], Alejandra Castillo[2], and Jennifer M. Bhatnagar[2]

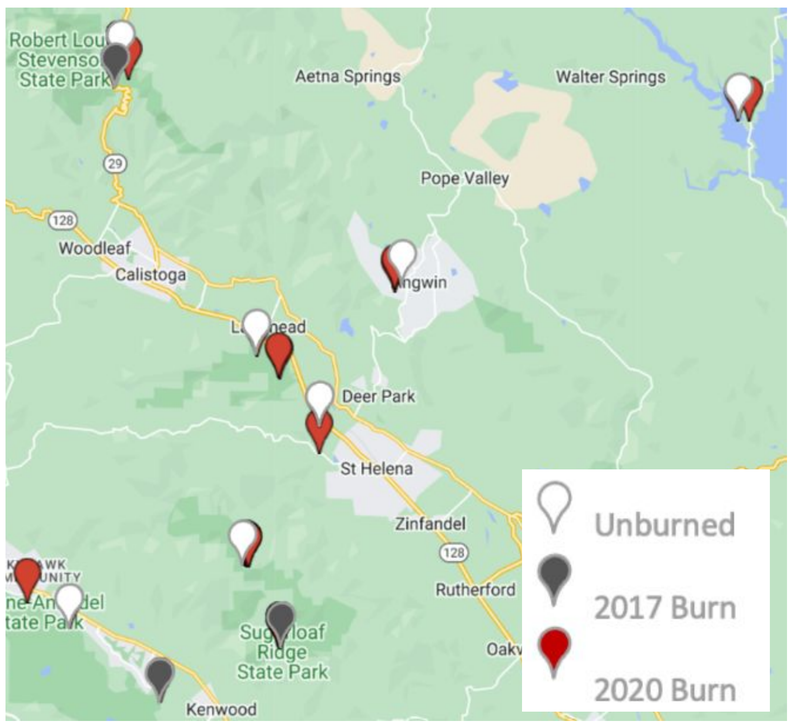
Lakeside School, 14050 1st Ave NE, Seattle, WA 98125[1],
Boston University Department of Biology, Commonwealth Ave, Boston, MA 02215[2]

Introduction

- Recent increase in wildfires and urbanization.
- California oak trees are fire-adapted, but some struggle to regenerate after fires.[1, 2]

Hypothesis: Trees more recently burned and closer to the edge have lower biomass (less stems and lower basal area) because of the harsher environmental conditions.

Methods



- Took distance at breast height (DBH) of all oak trees in a 10-meter radius at distances from edge (DFE): 0, 15, 30, and 60 meters.
- Used DBH to calculate individual and stand-level basal area.
- Recorded number of oak stems.
- Log transformations for ANOVA statistics and Tukey tests.

Discussion

- Trees from 2020 burn year have greatest number of oak stems, suggesting that recent wildfires lead to a surge in the growth of stems.
- This wanes off after a few years, as forests with burns from 2017 have less stems than unburned forests. Competition caused 2017 many of the stems to die.
- Total and individual oak BA is lowest at the forest edge in recovering forests. This suggests forest regrowth after fire is not resulting in increased biomass accumulation rather more stems, especially at the forest edge.

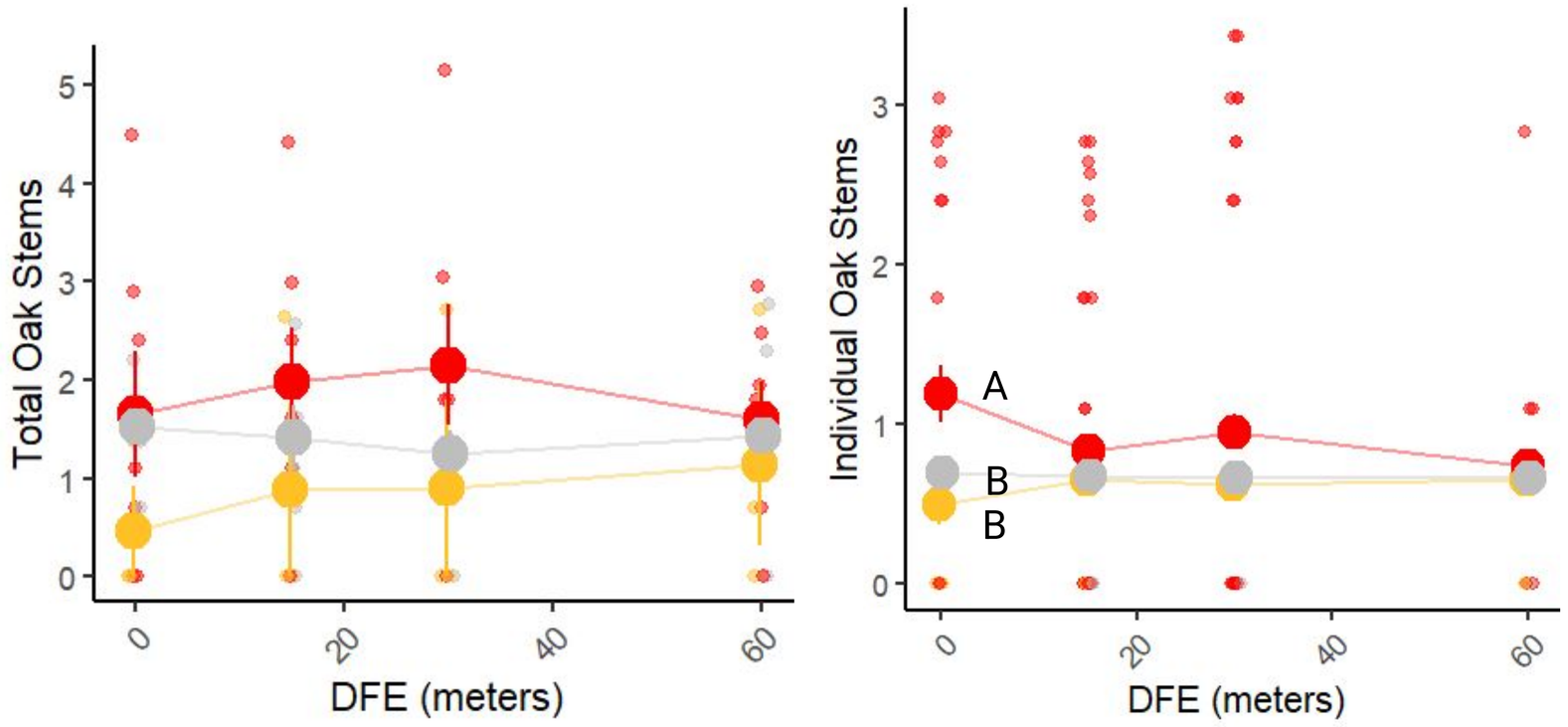
References

Results

Burn increases shoots, especially at the edge.

Burn (p = 0.0056)

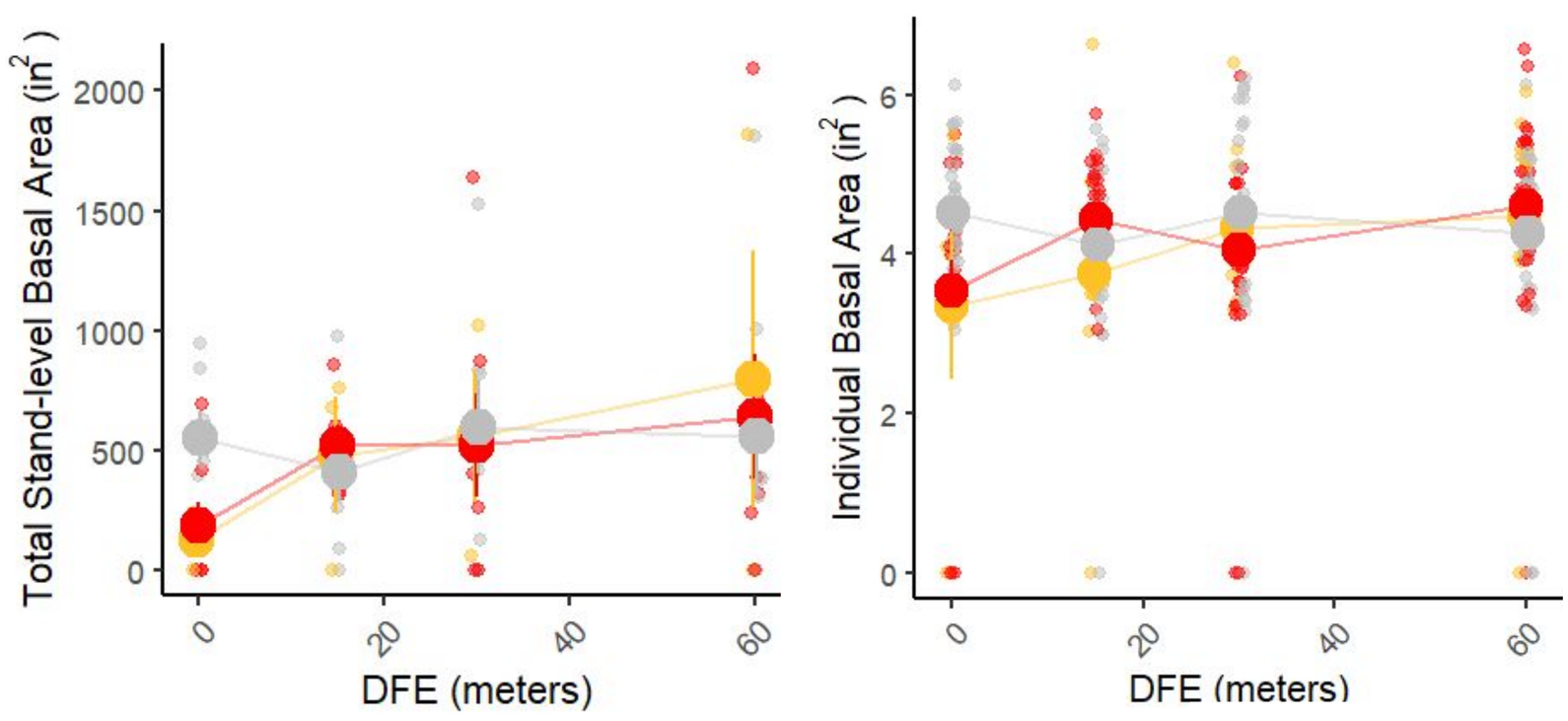
DFE (p = 0.0181)
Burn (p = $8.34 * 10^{-8}$)



Basal area increases as DFE increases.

DFE (p = 0.0632)

DFE (p = 0.0384)
DFE: Burn (p = 0.0504)



Summary

- Greatest number of oak stems from 2020.
- No significant effects from DFE for total, but significant for individual stem amount.
- No significant effects from wildfire for stand-level, but significant for individual basal area.

Burn Year
2017
2020
Unburned

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